



Technical Report on Cultural Resources

A Component of the Yakima River Basin Storage Feasibility Study
Ecology Publication Number 07-11-004

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Prepared by:

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PROJECT DESCRIPTION

The Yakima River Basin Water Storage Feasibility Study (Storage Study)—as guided by Public Law 108-7—examines the feasibility and acceptability of storage augmentation for the benefit of fish, irrigation, and future municipal water supply within the Yakima River Basin.

The State of Washington, represented by the Department of Ecology (Ecology), is the co-lead with the Bureau of Reclamation (Reclamation) in the Storage Study. In addition to Reclamation's authorization and focus on storage augmentation, Ecology is required to evaluate a broad range of potential actions—encompassing both structural and non-structural options both within the Yakima River basin and at locations outside the basin—that may improve water availability for fish, irrigation, and municipal demands. The Environmental Impact Statement (EIS) evaluates both Joint Alternatives proposed by Reclamation and Ecology and the State Alternatives proposed by Ecology.

Ecology has identified three State Alternatives within the Storage Study: Enhanced Water Conservation Alternative; Market-Based Reallocation of Water Resources Alternative; and Groundwater Storage Alternative. This cultural resources technical memo discusses the affected environment, environmental consequences, and potential mitigation measures for the three State Alternatives. For the purposes of specifically evaluating impacts to cultural resources, the State Alternatives are only grossly outlined at this stage. Therefore, the following statements and recommendations are based on a general understanding of Central Washington and the Yakima Valley, knowledge of how similar projects have affected cultural resources, and inductive logic.

REGULATORY ENVIRONMENT

The State Environmental Policy Act (SEPA) requires that cultural resources within a proposed project area must be identified, and that measures must be proposed to reduce or control impacts on these resources. Under SEPA, the Department of Archaeology and Historic Preservation (DAHP) provides formal opinions on sites' significance and the impact of the proposed projects on such sites. Other Washington state laws governing cultural resources protect Native American graves (RCW 27.44), abandoned historic cemeteries (RCW 68.60), and archaeological sites (RCW 27.53); these laws contain clauses regarding the inadvertent discovery of cultural resources during activities such as construction.

Executive Order 05-05 requires state agencies proposing capital projects not subject to Federal cultural resources regulations to review those projects to determine potential impacts to cultural resources as well as consult with DAHP and the affected tribes.

As the project is now defined, the State Alternatives are not subject to Federal regulations, while the Joint Alternatives are evaluated under the National Historic Preservation Act (NHPA) of 1966, as amended, as well as Executive Order 13007 (Indian Sacred Sites). Other Federal laws including the Native American Graves Protection and Repatriation Act (PL 101-601), the Archaeological Resources Protection Act (16 USC 470aa-470mm), and the American Indian Religious Freedom Act (42 USC §§ 1996, 1996a) regulate the protection of cultural resources. It is possible that the State Alternatives may be subject to Federal regulations if Federal permits or funding are involved at a later time.

ALTERNATIVE DESCRIPTIONS

For the State Alternatives, the following descriptions have been developed by Ecology.

ENHANCED WATER CONSERVATION

The Enhanced Water Conservation Alternative is an aggressive program of water conservation measures to improve basin water supply without constructing additional large water storage reservoirs. The alternative includes conservation measures for irrigation district infrastructure improvements, on-farm conservation and irrigation efficiency improvements, municipal conservation, and commercial and industrial conservation.

Specific water conservation measures include lining or piping existing canals, automating canals, constructing reregulating reservoirs on irrigation canals, improving water measurement and accounting systems, installing on-farm water conservation improvements, and other measures. Municipal, commercial, and industrial conservation measures include improvements to infrastructure, household conservation programs, changes in commercial and industrial practices, and the use of reclaimed water.

MARKET-BASED REALLOCATION OF WATER RESOURCES

The Market-Based Reallocation of Water Resources Alternative proposes to reallocate water resources through a water market and/or water bank to improve water supply in the Yakima River basin. Limited construction is anticipated as a result of this alternative.

GROUNDWATER STORAGE

The Groundwater Storage Alternative proposes to use surface water to recharge (replenish) aquifers and the natural storage capacity of geologic formations to store water for later recovery and use. Typically aquifers would be recharged with surface water during high flow periods. The stored water would be used to supply out-of-stream uses, increase streamflows through increased groundwater discharge, and/or replenish depleted groundwater storage. The source water is expected to be surface water from the Yakima River or one of its tributaries.

This alternative will likely require the construction of treatment facilities, wells, and conveyance infrastructure. Several potential locations have been identified but the selection process is on-going.

METHODOLOGY

Analysis of the impacts of the three proposed State Alternatives on cultural resources is based on a review of the known impacts to cultural resources on similar types of projects. This analysis is considered somewhat programmatic at this point, as the area of potential effects (APE) for the proposed State Alternatives has yet to be defined. However, inferences can be drawn based on the general proposed scope of these alternatives.

Analysis of cultural resources for the Joint Alternatives was reviewed as part of the analysis of the State Alternative methods. It is important to note that cultural resources are evaluated under different regulations for the State and Joint Alternatives.

AFFECTED ENVIRONMENT

The focus of this study is the Yakima River basin (Figure 1). This region in south-central Washington includes three counties: Yakima, Kittitas, and Benton. The Yakima River basin is centered on the southeast-flowing Yakima River. It originates in the Alpine Lakes Wilderness near Snoqualmie Pass and joins the Columbia River just south of Richland. Existing reservoirs include Cle Elum, Kachess, Keechelus, Bumping, and Rimrock Lakes. Interstate 90 (I-90) and the Burlington Northern Santa Fe Railroad (BNSF) are major transportation thoroughfares that pass through the Yakima River basin. Principal towns include Richland, Yakima, and Ellensburg. The Yakima Indian Reservation is located just south of the town of Yakima.

The Yakima River basin is bounded on the west by the Cascade Mountains. The Cascade Mountains are a major north-south oriented range associated with the Cascadia Subduction Zone. The closest volcanic peak is Mt. Rainier. East of the Cascades, the landscape is much drier and is dominated by large, east-west running ridges. Major uplifted landform features include Umtanum Ridge, Ahtanum Ridge, Yakima Ridge, Rattlesnake Hills, Toppenish Ridge and the Horse Heaven Hills.

Traditional land use in the study area spans 8,000 years as documented by cultural resources studies in the Yakima River basin. Traditional subsistence activities included large and small game hunting, fishing, hunting and trapping of birds, gathering of roots, plants, and berries. Fish of all types were caught in rivers, lakes, and creeks, using a variety of methods such as weirs, traps, platforms, and nets. Traditional social activities include hunting trips, seasonal rounds, annual congregations and celebrations, ritual activities, traditional rites of passage, warfare and raiding, and trade. Villages, seasonal camps, rock shelters, resource procurement sites, lithic quarry and reduction sites, ritual sites, and burials have all been documented archaeologically. Typical burial features include talus pits, pits in volcanic ash, and cremation circles.

The long term history of the Yakima Valley is one of hunter-fisher-gatherer seasonal rounds, a foraging based subsistence. Many of the largest sites are located along perennial rivers such as the Yakima and Columbia. Non river valley sites are dispersed throughout the uplands, with settlement patterns affected by factors such as surface water availability, locations of springs, proximity to important biotic resources, proximity to natural corridors, lithic raw material availability, and natural shelter from the elements (Lewarch et al., 2000:105).

There is a rich ethnographic heritage in the region associated with living cultures including the Yakama, Umatilla, Colville, Wanapum, Wenatchee, and Snoqualmie peoples. Access to the spring and fall salmon runs were shared, or traded with most other groups, both in and outside the region. Some individual fishing locales were controlled through inherited rights, although territorial tensions were often ameliorated through sharing networks. Winter villages on the Yakima River provided shelter from the coldest seasons. During salmon runs, subsistence activities were focused on river-side salmon procurement and processing. The spring and summer, except for during salmon runs, were occupied by an upland foraging subsistence. Fall meant trade, travel, and preparation for the winter season, with groups returning to their winter villages around November.

Figure 1. Location of the Yakima River Basin (Source: U.S. Geological Survey).



At the time of European/Euroamerican contact, the Yakama and surrounding groups were organized into semiautonomous bands or villages. The Yakama are closely related to other Sahaptin-speaking groups on the Columbia Plateau such as the Walla Walla, Umatilla, and Nez Perce. Although autonomous group size was small, marriage, trade, and ceremonial networks were widespread, extending throughout the region. Trade networks extended to the west, with Coastal Salish and Chinookan peoples, and to the east with the Nez Perce and Plains groups. These west-east contacts are evident due to trade objects (shell and horses) and shared cultural traits (long house and tipi).

Although fur trappers and explorers had been making sporadic forays into the Columbia Basin since the early 1800s, permanent settlement was not attempted until the establishment of Catholic missions in both Yakima Valley and Kittitas Valley in the 1840s. The goal of these missions was to clear the way for Euroamerican settlement and convert local Native Americans to Catholicism. Hostilities developed between the two groups and hindered substantial development until the signing of the Yakima Treaty in 1855. This treaty brought together for the first time as one "confederation" what had been 14 formerly independent tribes and bands speaking three different languages. These groups would live together on the newly created 1,200,000-acre Yakama Indian Reservation.

Intrusions by gold prospectors prompted Euroamerican and Indian hostilities, resulting in the Yakima Wars of 1855 and 1856. The Indian resistance was crushed soon thereafter. By the 1860s the valleys emerged as prime grazing land for cattle headed north to mining towns in British Columbia. The cattle industry would fluctuate but remain integral to the economy of the Kittitas Valley and only diminished in the 1970s due to rising feed costs and price controls.

The technology for subsistence based agriculture accompanied the first settlers to the region who quickly identified the potential of the land to support a variety of crops. However, reliable irrigation was lacking. Private, small-scale irrigation projects began from points off the Yakima and Naches Rivers, beginning in the mid 1860s (although Kamiakin, a Yakama Indian leader, may have irrigated his land before 1850). Irrigation co-ops followed and by the 1880s larger projects were planned in Yakima and Kittitas Counties. Ambitious irrigation programs in the early 1900s, including the Tieton Project in Yakima and the Cascade Canal and Town Ditch in Kittitas County, resulted in an agricultural boom that cemented the industry as the driving economic force throughout the Yakima River basin.

The Northern Pacific Railroad, which reached both valleys in the 1880s, provided a vital connection to markets in the east and west. This new link promoted agricultural growth which in turn led to increased development. The railways also allowed for greater utilization of natural resources on the eastern fringe of the Cascade Mountains. The logging industry was well established along the higher, westernmost portions of three counties and the railways allowed efficient collection and distribution of timber. The railways also aided the growing mining industry in upper Kittitas County.

ENHANCED WATER CONSERVATION

The affected environment of the Enhanced Water Conservation Alternative includes the spatial extent of the areas affected by the Enhanced Water Conservation measures. The scale of the

impact is relative to the scale of the community-based changes that will take place. Because the Enhanced Water Conservation Alternative is an initiative based on better use and management of water resources already existing within the Yakima Valley, the affected environment of this alternative is locally oriented.

This alternative will likely involve efficiency-based improvement to existing irrigation infrastructure. The environment primarily effected by this alternative is the area disturbed by the modifications to existing infrastructure including irrigation systems, pumps, and water treatment sites. Mechanical removal of old infrastructure and the installation of new infrastructure have the potential to impact buried cultural resources. Secondly, the affected environment includes any areas with modified or increased patterns of human activity. Areas of potential stream or spring flow increase or conversely currently green areas reliant on current water "waste" should also be considered part of the affected environment.

MARKET-BASED REALLOCATION OF WATER RESOURCES

The affected environment for the Market Based Reallocation Alternative includes those areas affected by storage, and conveyance of water resources reallocated to the Yakima Valley. This most likely includes existing upstream reservoirs, such as Cle Elum, Kachess and Keechelus Lakes. The affected environment also includes any rivers and streams affected by the process of market-based reallocation. Any new conveyance lines would also be considered part of the affected environment. The affected environment for the Market-Based Reallocation Alternative depends on the specific actions taken under this alternative, and since they are market-based, these actions could change over time. Currently, this alternative is defined on a broad programmatic level. The scale of the affected environment under this alternative is commensurate to the scale of change and development necessary to undertake the action of reallocating water resources. For example, if this action necessitates drawdowns on upstream reservoirs then cultural resources within these drawdown zones and their bordering areas would be considered part of the affected environment. Furthermore, if this reallocation involves the diminishment of current water resources in another area, then these regions should be considered part of the affected environment as well.

GROUNDWATER STORAGE

The affected environment of the Groundwater Storage Alternative includes any areas selected for direct injection and/or surface infiltration sites. It also includes any conveyance lines, water treatment facilities, and groundwater recovery pumping stations. The affected environment includes the footprint of and staging areas associated with any new construction resulting from the undertaking of this alternative. The affected environment includes all those areas where ground disturbing impacts are proposed. The larger the area developed, the greater the number of potential cultural resources affected.

Groundwater Storage sites would be located away from perennial streams and rivers. As Pre-Contact sites are often located along rivers, streams, and springs with surface flow, infiltration/injection sites have less potential of affecting significant cultural resource sites.

Groundwater Storage sites are expected to have a reasonable degree of locational flexibility, and therefore the option of avoiding cultural resource sites. The same is true of access roads, conveyance lines, and staging areas.

The locations of the proposed direct injection, surface infiltration reservoirs, conveyance, and groundwater recovery sites have not been determined at this time. It is expected that the Groundwater Storage infrastructure will be located in flat upland terraces in the Yakima River basin away from perennial streams and rivers in geologic exposures of either alluvial sediments or other unconsolidated soils to allow for the maximum permeability. Based on these two conditions it is possible to draw some preliminary inferences regarding potential impacts. For example, surface bedrock exposures will probably not be selected for injection/infiltration sites; therefore, it is unlikely that lithic quarry or petroglyph sites will be affected. Limited activity sites, resource procurement/processing sites, Pre-Contact habitation sites, and historic sites might be affected.

The storage of groundwater has the potential to impact buried cultural resources. For example, an increase in the water table might saturate subsurface archaeological strata that would otherwise be dry. This saturation, or wet/dry cycles could adversely affect these resources including chemical changes and degradation of organic materials.

IMPACTS

ENHANCED WATER CONSERVATION

Construction Impacts

Any on-farm conservation which involves ground disturbing activities has the potential to impact cultural resources. These include any new construction, such as ponds and conveyance lines. Overall, the impact to cultural resources from Enhanced Water Conservation efforts is expected to be moderate, depending on the scale of the conservation measures.

One of the projected aspects of enhanced water conservation is the efficiency based improvement of existing agricultural irrigation systems. Improvements to agricultural infrastructure have the potential to impact cultural resources in two ways. The first potential impact involves the replacement or modification of historic farm infrastructure, i.e., any building or modified landscape greater than 50 years old. Disturbed or modified farm infrastructure will have to be evaluated as to its age and potential historical significance depending on state or Federal involvement. For example, projects on private property supported by grants from the Natural Resources Conservation Service would be subject to the NHPA and would likely require at least archival review of the project for cultural resources and probably fieldwork as well.

Although there is no significant new infrastructure improvements expected as a result of this alternative, any new ground disturbing construction has the potential to impact cultural resources. Impacts to cultural resources from municipal conservation might be expected if there are replacements to in-use historic-age water management infrastructure, as well as if there is ground disturbing construction for new facilities. Also, if new canals or pipelines or canals are installed then these corridors could impact cultural resources. Revamping existing canals or pipelines is not expected to impact subsurface cultural resources as long as the new construction does not exceed the limit of previous disturbance.

Long-Term Impacts

Potential long-term impacts to cultural resources of the Enhanced Water Conservation Alternative could include modified patterns of modern human activity, increased animal disturbance (bioturbation and krotovina), and potentially alterations to stream or spring flows. If conservation measures draw more people into areas with cultural resources, there is a potential increase of impacts from development and surface artifact collection. Cultural resources are likely to be impacted if Enhanced Water Conservation allows new land to be brought into agricultural use. If farming productivity increases then there is also a potential of increased bioturbation and krotovina impacts due to increased rodent populations and increased vegetation. Potential alterations to stream or spring flows might increase erosion at sites and affect the integrity of setting and feeling of streamside sites. Furthermore, on an aesthetic level, large-scale changes to existing farm infrastructure would potentially impact the integrity of setting and feeling for significant historic area cultural landscapes or even Traditional Cultural Properties (TCPs).

Overall, the potential impacts to cultural resources resulting from Enhanced Water Conservation measures are projected to be moderate. Avoidance of cultural resource impacts might be possible through project review.

MARKET-BASED REALLOCATION OF WATER RESOURCES

Construction Impacts

No impacts to cultural resources are anticipated due to the Market-Based Reallocation of Water Resources Alternative as this alternative consists primarily of transfer of water rights and not actual transfer of water. In cases where additional water is transferred for agricultural uses, it is assumed the land will already be in agricultural use providing no significant change to the current conditions. If new fields are brought under cultivation then there would be an increased impact.

Long-Term Impacts

Long-term impacts under the Market-Based Reallocation of Water Resources Alternative would be similar to those discussed for the Enhanced Water Conservation Alternative. By transferring water from lower value to higher value uses, this alternative may result in more intensive agricultural activity in some areas. If Market-Based Reallocation effects stream, spring, or river flows there is a potential impact to cultural resources, particularly for TCPs.

GROUNDWATER STORAGE

Construction Impacts

The Groundwater Storage Alternative has the potential to impact cultural resource properties located within the footprint of any new ground disturbing construction activities, including but not limited to: surface infiltration reservoirs, subsurface injection sites, water treatment sites, conveyance lines, access roads, electrical transmission corridors, and staging areas. One moderating factor is that the types of landforms expected to be selected for Groundwater Storage infrastructure will be mainly located away from significant streams and rivers, areas which typically have fewer cultural resources than areas on perennial water sources. While upland areas were also occupied by Native Americans and impacts to archaeological properties might occur, cultural resources generally found in upland areas are often less dense and more ephemeral. The only infrastructure proposed near rivers is intake facilities. If alternative site locations are feasible, then complete avoidance of significant cultural resources may be possible. Two factors contribute to the severity of potential impacts under this alternative: the probability of the landform to contain archaeological sites and the flexibility to relocate injection/infiltration sites if significant cultural resources are located within their footprint.

Long-Term Impacts

Surface infiltration reservoirs are large facilities, and have the potential to adversely affect traditional cultural landscapes. This could have a negative impact on the integrity of setting and feeling of nearby archaeological sites and TCPs. Increased localized streamflow volume increases the potential for erosion of stream-side archaeological sites. However, restoring

historic streams, springs, or seeps associated with historically significant areas like TCPs may actually increase their integrity. Overall, the impact to cultural resources from the Groundwater Storage Alternative is expected to be low to moderate.

MITIGATION MEASURES

Depending on the funding source and degree of Federal involvement and permitting, the Section 106 process would need to be followed for the State Alternatives, including tasks such as archival research, intensive cultural resource survey, National Register of Historic Places (NRHP) site and district evaluation, general Cultural Resources Management Plans (CRMPs), site-specific Historic Property Treatment Plans (HPTPs), NRHP eligibility testing, nature and extent testing, data recovery, and synthetic documentation. For projects that do not require compliance with NHPA, any inadvertent discovery of cultural resources on private land would be subject to RCW 27.53 and RCW 27.44 which protect cultural resources and Indian burials on private land from being knowingly disturbed.

The construction of new infrastructure or renovation of existing infrastructure could require additional environmental review depending on the funding of the project, after which the exact mitigation measures would be developed in coordination with DAHP, the affected tribes, and other interested parties. Ecology will develop a CRMP for the Enhanced Water Conservation Alternative in consultation with interested parties. The CRMP will support the goals of the Conservation Alternative while ensuring appropriate cultural resources management. The CRMP will outline efforts to identify cultural resources in the project area, develop a review process for planned actions, outline potential mitigation measures, and include processes to identify and resolve conflicts.

Mitigation measures could include archaeological survey or even remote sensing during planning to allow avoidance; excavation of archaeological sites that would be adversely affected by the projects; documentation of historic structures; site protection/stabilization, including site burial, use of filter fabrics, revegetation, site armoring, and other measures; efforts to reduce vandalism through public education, fencing, or site surveillance; and archaeological monitoring during construction (Draper, 1992; Lenihan et al., 1981). Construction contracts would require that if any archaeological material is encountered during construction, construction activities in the immediate vicinity would halt, and DAHP and a professional archaeologist would be contacted for further assessment prior to resuming construction activity in that area.

Mitigation measures for TCPs would need to be determined in consultation with the appropriate cultural group. Because TCPs contribute to the maintenance of a culture, mitigation efforts may include documentation of the significance of the place through oral histories or recording traditional storytellers. It is important to note that it is not always possible to mitigate adverse effects to TCPs.

In summary, all three of the State Alternatives (Enhanced Water Conservation, Market-Based Reallocation of Water Resources, and Groundwater Storage) are expected to have moderate impacts on cultural resources. All three alternatives are still in the planning stage, and therefore the mitigation recommendations extended here are broad and programmatic.

REFERENCES

- Draper, John A. 1992. *The 1992 Options Analysis Study: Cultural Resources Appendices*. Contributions to Cultural Resource Management No. 38. Center for Northwest Anthropology, Washington State University, Pullman.
- Galm, Jerry R. and Ruth A. Masten. 1988. *A Management Plan for Cultural Resources at the Rock Island Hydroelectric Project, Chelan and Douglas Counties, Washington*. Prepared for the Chelan County Public Utility District No. 1 FERC Project No. 943 by Archaeological and Historical Services, Eastern Washington University, Report No. 100-66.
- Lenihan, Daniel J. et al. 1981. *The Final Report of the National Reservoir Inundation Study*. 2 vols. U.S. Department of Interior National Park Service, Southwest Cultural Resources Center, Santa Fe.
- Lewarch, Dennis E., Amy E. Dugas, and Lynn L. Larson. 2000. Cultural Resources (Archaeological Site) Inventory and Road Mitigation Survey on the Yakima Training Center, Kittitas and Yakima Counties, Washington. LAAS Technical Report #99-18. Larson Anthropological Archaeological Services Limited, Seattle.